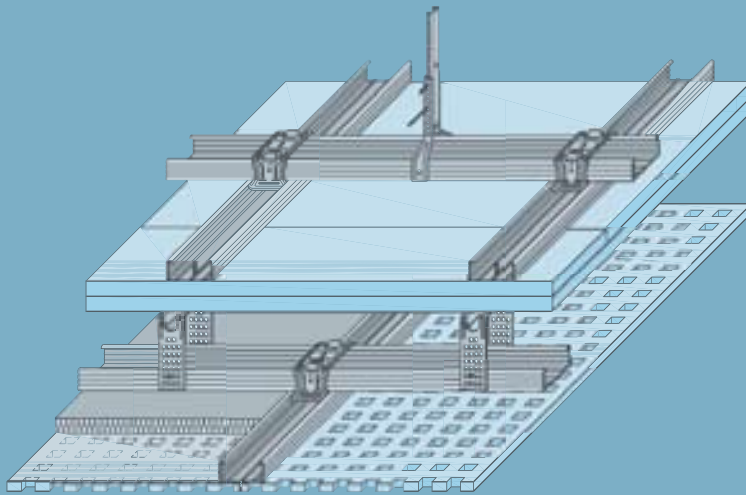


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Knauf Board Ceilings

D112 Metal grid CD 50x27

D113 Flush metal grid CD 50x27

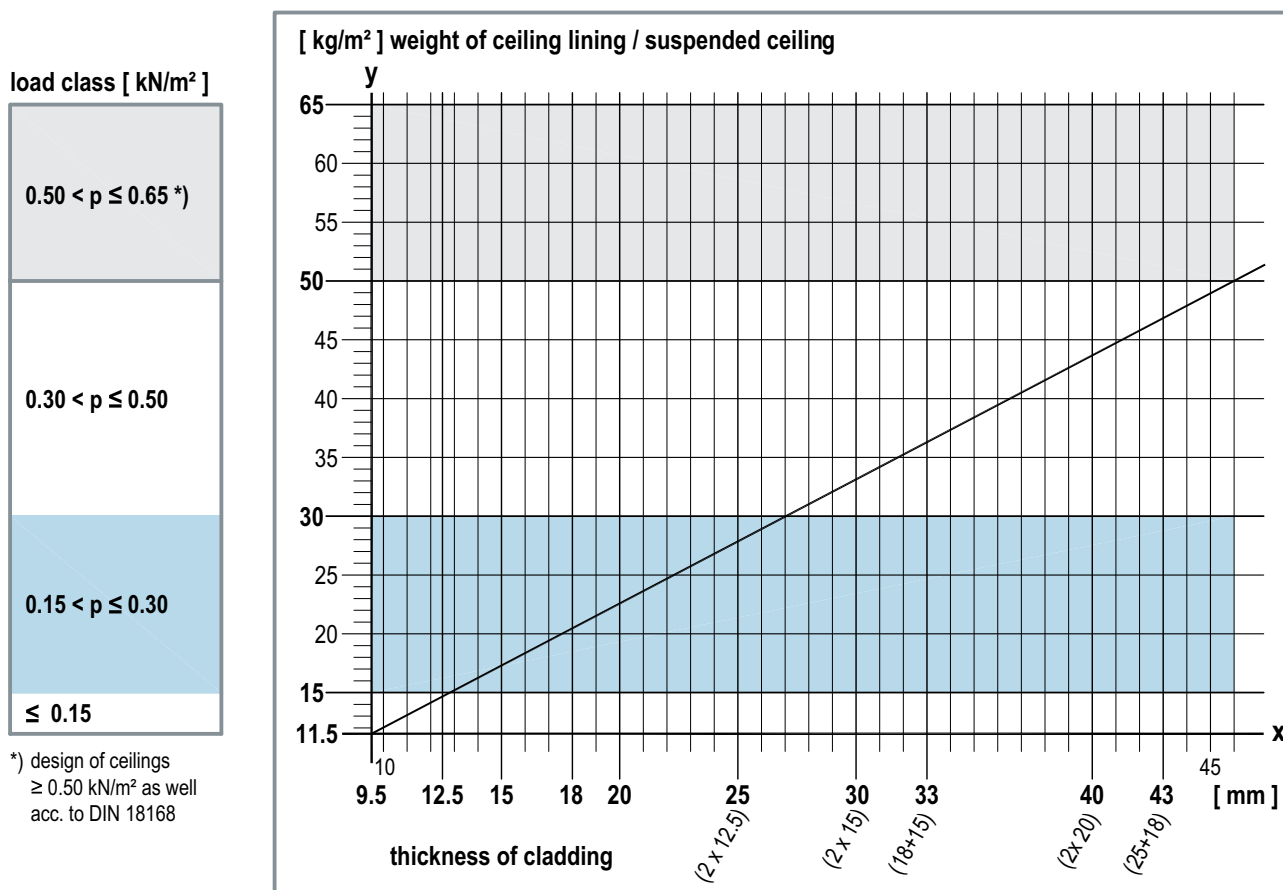
**Now with
CD 50x27**

The structural, static properties, and characteristic building physics of Knauf systems can solely be ensured with the exclusive use of Knauf system components, or other products expressly recommended by Knauf.

Dimensioning of substructure

1. Determination of the weight of the ceiling lining / suspended ceiling depending on thickness of cladding

Depending on the chosen thickness of cladding in mm (x-axis) the weight per unit area of the ceiling lining / suspended ceiling including grid and suspension can be read off from the y-axis at the intersection point with the marked diagonal



2. Consideration of extra loads

Extra loads from insulation required for fire protection **and** from insulation not required for fire protection ($0.05 \text{ kN/m}^2 = 5 \text{ kg/m}^2 \text{ max.}$) as well as extra loads from system "Multi-level Ceiling" ($0.15 \text{ kN/m}^2 = 15 \text{ kg/m}^2 \text{ max.}$) increase the total weight per unit area of the suspended ceiling / ceiling lining and should be taken into account for the load class determination. The determined intersection point from the 1st step has to be parallel-shifted by the rate of the extra load in direction of the y-axis (upwards).

3. Determination of the load class

The load class (kN/m²) can be determined with the resulting total weight per unit area of the ceiling lining / suspended ceiling from steps 1 and 2.

4. Dimensioning the substructure

Depending on fire protection requirements and load class the following spacings of the substructure are specified:

a b c

- without fire protection 1)
- fire protection from below 2)

spacings of suspenders / anchors

a

spacings of carrying channels / timber battens

c

normally dimensioned according to DIN 18168

spacings of furring channels / timber battens

b

- 1) permissible span widths of cladding acc. to DIN 18181
- 2) according to fire protection proofs

- fire protection from above (plenum)
- fire protection from below and from above

spacings of suspenders / anchors

a

spacings of carrying channels / timber battens

c

spacings of furring channels / timber battens

b

have to be installed according to fire protection proofs

- suspenders and connectors according to fire protection proofs; Consider additionally required measures on pages 6 and 10.

- normally use suspender 0.25 kN, for load class $> 0.30 \text{ kN/m}^2$ use suspender 0.40 kN.

D11 Knauf Board Ceilings

Knauf Boards / Span Widths of Cladding / Fastening of Cladding



Knauf Boards

Board type		General properties		Building physics			Sophisticated applications		
		easy installation	few control joints	fire protection	sound protection	statics / strength	surface quality	mitering technology	molded areas
Knauf Diamant (hard gypsum board)	FM *)	• • •	• • •	• •	• • •	• • •	• •	• • •	• •
KNAUF Piano (sound shield)	RG	• • •	• • •	•	• •	•	• •	• • •	• •
KNAUF Piano F (sound shield)	FR / FM *)	• • •	• • •	• •	• •	• •	• •	• • •	• •
Knauf Fire-Resistant Board	FR / FM *)	• • •	• • •	• •	•	• •	• •	• • •	• •
Knauf Wallboard	RG / MR *)	• • •	• • •	•	•	•	• •	• • •	• •

○ unsuitable • suitable • • more suitable • • • most suitable

*) MR and FM (impregnated) boards are most suited for humid rooms

Allowable span widths of cladding according to DIN 18181

all dimensions in mm

Board thickness	Maximum spacings of furring channel b	
	without fire protection	with fire protection
12.5 / 2x 12.5	600	spacings of furring channels acc. to pages 6 to 9
15	600	
18	600	
20 Solid Board / Panel Board	625	
25 Solid Board	800	

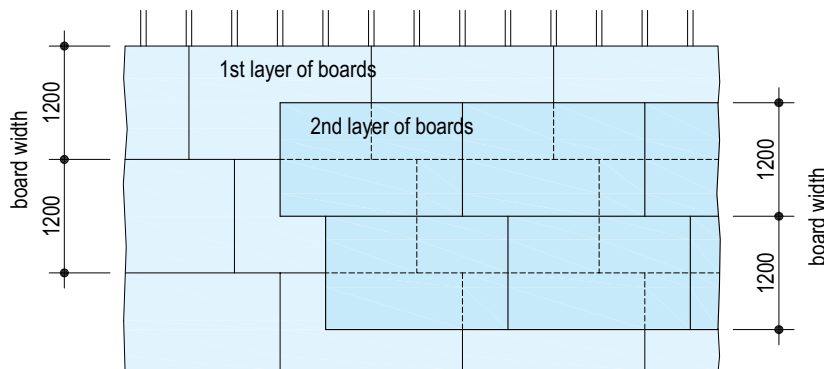
Knauf Boards, fastening with Knauf Drywall Screws TN

• spacing of screws 170 mm

Cladding Thickness in mm	Metal grid minimum penetration ≥ 10 mm Metal thickness $s \leq 0.7$ mm
≤ 15	TN 3.5 x 25 mm
18 to 25	TN 3.5 x 35 mm
2x 12.5	TN 3.5 x 25 mm + TN 3.5 x 35 mm
2x 15	TN 3.5 x 25 mm + TN 3.5 x 45 mm
18 + 15	TN 3.5 x 35 mm + TN 3.5 x 45 mm
2x 20 / 25 + 18	TN 3.5 x 35 mm + TN 3.5 x 55 mm

Multi layer cladding

In case of multi layer cladding, apply layers with staggered joints according to application scheme.
Press boards of each layer firmly on to the substructure and screw each layer separately.
For fastening of first layer, spacing of screws can be increased up to max. 500 mm (for cladding thickness 25 + 18 mm/ 2x 20 mm up to max. 300 mm according to installation scheme on page 19) if second layer is applied immediately afterwards (within one working day).
In case of multi layer cladding, a filling of joints of first layer without further finishing is sufficient.



D11 Knauf Board Ceilings

Perimeter Spacings of Substructure / Height of construction

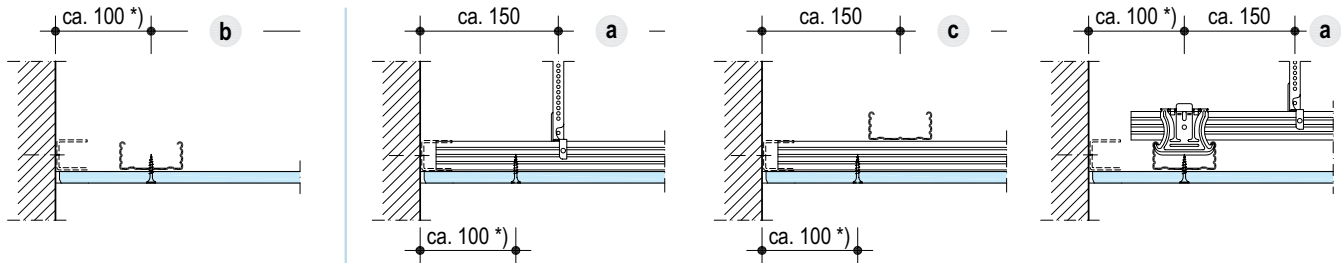


Perimeter spacings of substructure scheme drawings, examples

all dimensions in mm

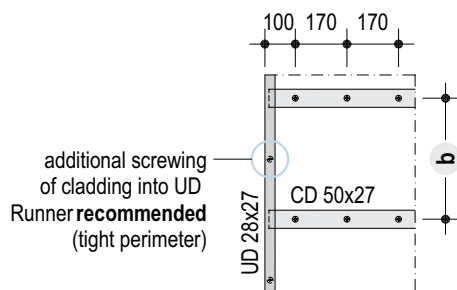
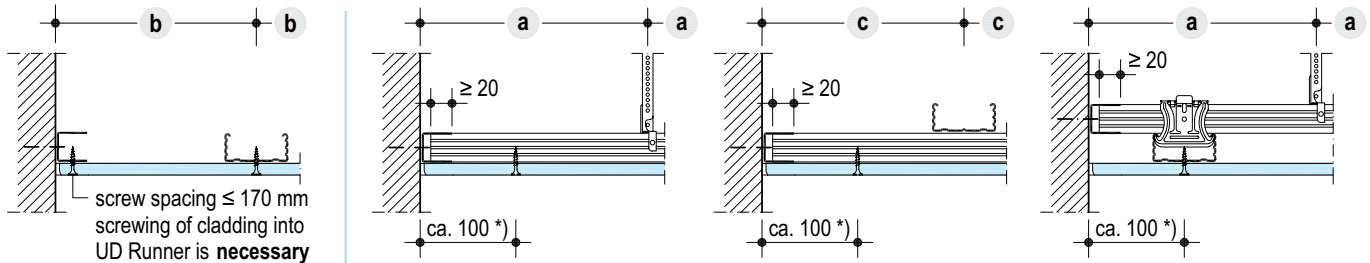
Option 1 non-bearing connection (connection does not bear loads of the ceiling)

- without perimeter joint covering
- covering with UD Runner as installation aid / in case of fire protection and sound protection, spacing of anchors of UD Runner up to **approx. 1 m**



Option 2 bearing connection

- The spacing of anchors of the UD Runner is reduced to ≤ 625 mm (use a dowel suitable for substrate).
- Carrying / furring channels should be inserted into bearing UD Runners for 20 mm min.
- Maximum allowable spacings (suspender, carrying / furring channel) are given in tables of respective system.



Notes

All connections of board ceilings can be installed according either to option 1 or option 2. Connection details on the following pages show:

- **option 1** D112, D116
- **option 2** D113

- a** = spacing of suspenders (span width of carrying channels / timber battens)
- c** = spacing of carrying channels / timber battens (span width of furring channels / timber battens)
- b** = spacing of furring channels / timber battens (span width of cladding)
- *)** max. cantilever of cladding

Height of construction

height of construction = sum of suspension height, height of substructure and cladding thickness

System	Suspension			Substructure	
	with Nonius Hanger Top Nonius Stirrup Nonius Hanger Bottom		with wire Ankerfix Rapid Hanger	Ceiling below Ceiling Universal Bracket	 channel b x h total height mm
D112	130	130	110	up to 300	60x27 27 60x27 + 60x27 54
D113	-	130	110	up to 300	60x27 27

Calculation example

D112 with Nonius Hanger Bottom (130 mm), carrying channels and furring channels (54 mm) and cladding (2x 12.5 mm) = 209 mm approx. 210 mm required height of construction for suspended ceiling

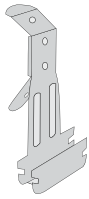
D11 Knauf Board Ceilings

Suspensions, Load Bearing Capacity Classes According to DIN 18168-2

0.25 kN (25 kg) load bearing capacity class

Ankerfix / Rapid Hanger

with lock
for CD 50x27



suspended with
Hanging Wire

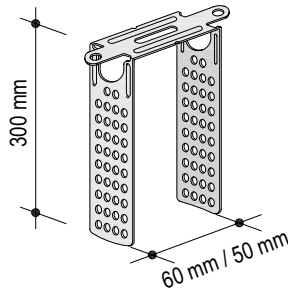
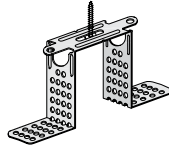
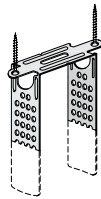


anchoring to concrete ceiling:
Knauf Ceiling Steel Dowel
acc. to ABZ Z-21.1-1519

0.40 kN (40 kg) load bearing capacity class

Universal Bracket for CD 50x27

Cut and bend
Universal Bracket
according to
required
suspension height

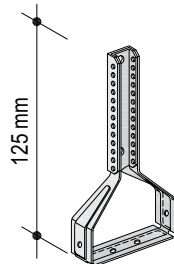


anchoring to wood joist ceiling
2x Knauf TN 3.5x35 into tabs
or
1x Knauf FN 5.1x35 in the middle
acc. to ABZ Z-9.1-251

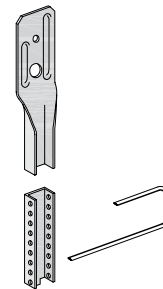
anchoring to concrete ceiling:
Knauf Ceiling Steel Dowel
acc. to ABZ Z-21.1-1519

Nonius Stirrup for CD 50x27

Bend Nonius Stirrup around channel
and fit together until it snaps



suspended with
Nonius Hanger Top
and
Nonius Pin
(secure against sliding out)



anchoring to concrete ceiling:
Knauf Ceiling Steel Dowel
acc. to ABZ Z-21.1-1519

Note

Additional measures in case of • fire protection from above (plenum) • fire protection from above and from below
use fastener approved for fire protection Knauf ceiling steel dowel (mounted in accordance with ABZ Z-21.1-1519)

D11 Knauf Board Ceilings

Types of Basic Ceiling, Fire Protection from Below and from Above



Types of basic ceiling I to III

Type I	Ceilings with steel girders exposed to plenum with U/A ratio of $\leq 300 \text{ m}^{-1}$ and top cover made of light concrete core panels according to DIN 4028 or aerated concrete slabs according to DIN 4223		Ceilings made of reinforced concrete beams according to DIN 1045 with intermediate units made of light concrete according to DIN 4158 or bricks according to DIN 4159 and DIN 4160	
	Reinforced concrete beam ceilings according to DIN 1045 with intermediate units made of light concrete according to DIN 4158 or made of bricks according to DIN 4159 and DIN 4160		Reinforced concrete ceilings in connection with embedded steel girders	
Type II	Ceilings with steel girders exposed to plenum with U/A ratio of $\leq 300 \text{ m}^{-1}$ and top cover made of light concrete in-situ concrete according to DIN 1045 or precast slabs with static effective coat of in-situ concrete according to DIN 1045 or precast units as core panels made of reinforced or prestressed concrete			
Type III	Ceilings made of reinforced or prestressed standard concrete slabs but without units or intermediate units made of light concrete or bricks		Reinforced or prestressed concrete slabs acc. to DIN 1045 resp. DIN 4227 made of standard concrete	
	Reinforced or prestressed core panels acc. to DIN 1045 resp. DIN 4227 made of standard concrete		Reinforced concrete ceilings with beams and intermediate units acc. to DIN 1045 made of standard concrete	
	Reinforced concrete beam ceilings acc. to DIN 1045 without intermediate units or with intermediate units made of standard concrete		Two-way flat slab and coffered ceilings according to DIN 1045 made of standard concrete	

Fire protection from below and from above (basic ceiling)

Board ceilings in connection with basic ceilings type I to III

Knauf System	Basic ceiling type acc. to DIN 4102-4			Knauf System constr.	Mineral wool insulation in plenum (see page 7)	Minimum plenum height between basic ceiling and cladding - a -	Proof (see page 7)
	I	II	III	cladding min. thickness	sub-structure max. spacing of furring channels b	mm	
	Fire rating (hours)			mm	mm	mm	

K215 / K218 Knauf Fireboard Ceilings A1 with metal grid

	1.5						
		1.5					
			1.5				
				• Knauf Fireboard A1 (Z-PA-III 4.290)			
	25				not allowed	-	
	20				not allowed	40	
	15				not allowed	200	
	25				S	80	
	20				not allowed	-	
	15			400	not allowed	40	
	12.5				not allowed	200	
	20				S	80	
	15				not allowed	-	
	12.5				not allowed	40	
	15				S	80	
							7

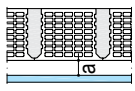
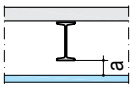
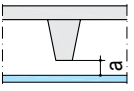
Note

Spacings of suspenders and of carrying channels as well as installation and application according to Data Sheet K21 Knauf Fireboard Ceilings A1

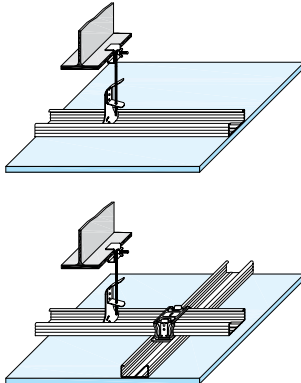
D11 Knauf Board Ceilings

Fire Protection from Below and from Above (Basic Ceiling)

Board ceilings in connection with basic ceilings type I to III

Knauf System	Basic ceiling type acc. to DIN 4102-4			Knauf System constr.	Mineral wool insulation in plenum (see page 7)	Minimum plenum height between basic ceiling and cladding - a -	Proof
	I	II	III	cladding min. thickness	sub-structure max. spacings of furring channels b		
				mm	mm	mm	
	Fire rating (hours)						

D112 Knauf Board Ceilings with metal grid

	0.5								
		0.5							
			0.5						
	1								
		1							
			1						
						</			

Note

Spacings of suspenders (anchors) and spacings of furring channels according to tables of respective system

Mineral wool insulation according to DIN EN 13162, chapter 3.1.1

S	building material class A melting point $\geq 1000^{\circ}\text{C}$ acc. to DIN 4102-17 thickness $\geq 50\text{ mm}$, density $\geq 40\text{ kg/m}^3$	G	building material class A
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Proofs

7	ABP P-3155/3992
8	DIN 4102-4, chapter 6.5.5, table 99

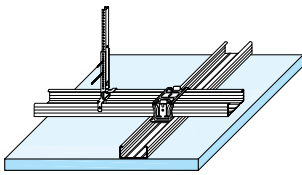
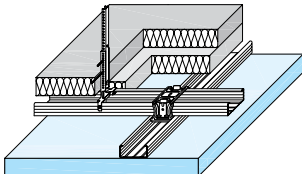
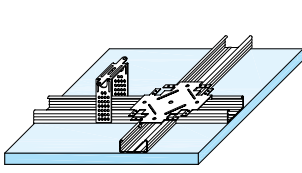
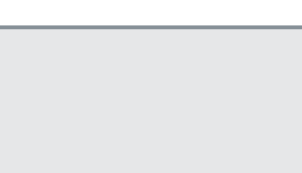
D11 Knauf Board Ceilings

Fire Protection from Below and / or from Above (Plenum)

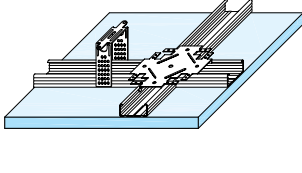
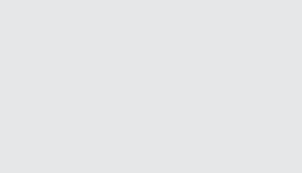
Board ceilings with sole fire protection

Requirement to basic ceiling in case of fire stress:	Fire rating in hours in case of fire stress		Knauf System construction cladding		sub-structure	insulation required for fire protection	
	from below	from above	type/ building material class	min. thickness	max. spacings furring channel	min. thickness	min. density
from below no fire protection requirements for basic ceiling / roof				mm	b mm	mm	kg/m³
from above (plenum) basic ceiling should be of same fire resistance class as suspended ceiling							

D112 Knauf Board Ceiling with metal grid

	0.5			20	600		
	1		Fire-Resistant Boards FR, A2	2 x 12.5	400		
	1.5			18 + 15	400		
		0.5		2 x 20	400		
	0.5	0.5	Fire-Resistant Boards FR, A2	25 + 18			
	1	1		15	400	mineral wool S 40 (60)	40 (30)
	1.5	1.5		18	600	+	
				2 x 12.5	400	mineral wool S 40 (60)	40 (30)
				18 + 15	400	150 mm wide on carrying channels	
				2 x 20	400	mineral wool S 2x 40 (60)	40 (30)
				25 + 18			

D113 Knauf Board Ceiling with flush metal grid

	0.5			18	400	mineral wool G 40	-
	1		Fire-Resistant Boards FR, A2	2 x 12.5	400		
	1.5			18 + 15	400		
				25 + 18	400		

Mineral wool insulation acc. to DIN EN 13162, chapter 3.1.1

S building material class A melting point $\geq 1000^{\circ}\text{C}$ acc. to DIN 4102-17	G building material class A	Note	Spacings of suspenders and of carrying channels acc. to table of respective system or in case of • fire protection from above acc. to page 10
		Proof	ABP P-3400/4965

D11 Knauf Board Ceilings

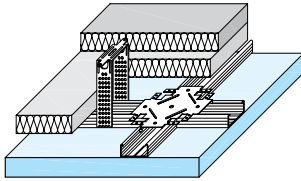
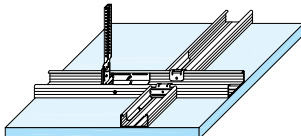
Fire Protection from Below and / or from Above (Plenum)

Board ceilings with sole fire protection

consider notes on page 8

Requirement to basic ceiling in case of fire stress:	Fire rating in hours in case of fire stress		Knauf System construction cladding	sub-structure max. spacings furring channel	insulation required for fire protection	
	from below	from above			min. thickness mm	min. density kg/m³
from below no fire protection requirements for basic ceiling / roof from above (plenum) basic ceiling should be of same fire resistance class as suspended ceiling			type/ building material class	min. thickness mm		

D113 Knauf Board Ceiling with flush metal grid

		0.5	Fire-Resistant Boards FR, A2	15	400	mineral wool S 40 (60) 40 (30)
	0.5	0.5		18	400	
				2 x 12.5	400	
	1	1		18 + 15	400	
 • Universal Connector	1.5	1.5	Fire-Resistant Boards FR, A2	25 + 18	400	mineral wool S 2x 40 (60) 40 (30)
	0.5	0.5		2 x 12.5	400	-

D11 Knauf Board Ceilings

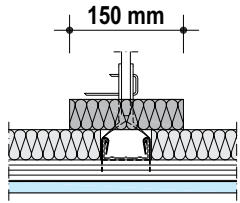
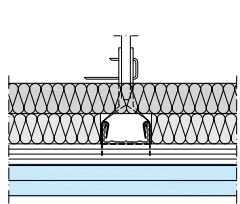
Fire Protection Solely from Above / Solely from Below and from Above (Plenum)



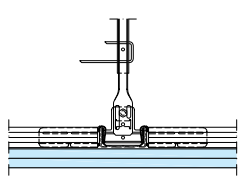
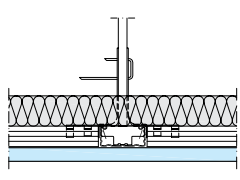
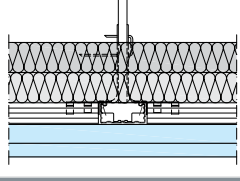
Maximum grid spacings • fire protection from above

Spacings of carrying channel c mm	Spacings of suspenders a mm	type	Fire rating in hours for fire protection • from above (from the plenum)	Mineral wool (S) required for fire protection min. thickness mm min. density kg/m³	scheme drawings
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D112 Knauf Board Ceiling with metal grid

850	750	Nonius Stirrup, Universal Bracket, Nonius Hanger Bottom	0.5 to 1	40 (60) 40 (30) 150 mm wide on carrying channel 40 (60) 40 (30)	
750	600	Nonius Stirrup, Universal Bracket, Nonius Hanger Bottom	1.5	40 (60) 40 (30) 40 (60) 40 (30)	

D113 Knauf Board Ceiling with flush metal grid

1250	650	Universal Connector	0.5	-	
1250	650	Nonius Hanger Bottom, Universal Bracket	0.5 to 1	40 (60) 40 (30)	
1250	500	Nonius Hanger Bottom, Universal Bracket	1.5	40 (60) 40 (30) 40 (60) 40 (30)	

Further data on pages 8 to 9

- thickness / type of cladding
- spacings of furring channels **(b)**
- mineral wool **(S)**

Additional constructional measures

- **Flush Connector for CD 50x27:** bend tabs and screw to lower channel (Metal Screws LN 3.5 x 9 mm)
- **Nonius Hanger Bottom:** screw tabs to CD 50x27 (Metal Screws LN 3.5 x 9 mm)
- **Universal Connector as suspender:** screw to CD Channel 50x27 (Metal Screws LB 3.5 x 9.5 mm)
- **anchoring to basic ceiling:** use anchor approved for fire protection Knauf Ceiling Steel Dowel (mounted in accordance with ABZ Z-21.1-1519)

Connections of light-weight partitions to classified suspended ceilings

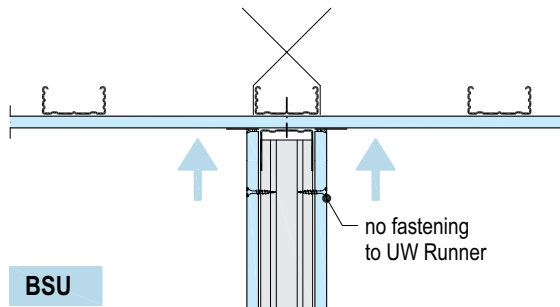
scheme drawings

Connections of partitions to classified ceilings (board ceilings) are only allowed if it is ensured that in case of fire and a premature collapse of the partition, the debris pieces of the partition may fall down without additional loading of the ceiling.

The following solutions are optional for the connection:

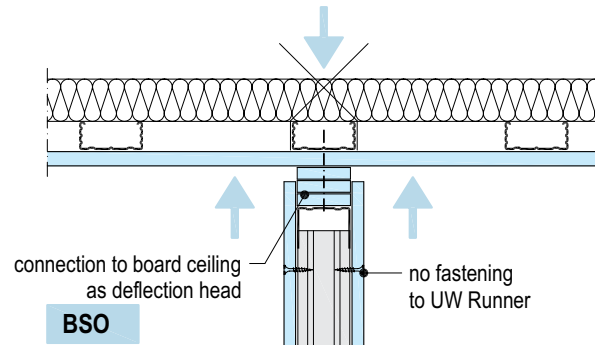
Fire protection from below

For suspended ceilings with fire protection **from below** do not fasten cladding to UW runner, but apply cladding tightly up to ceiling.



Fire protection from below and from above / from above

For suspended ceilings with fire protection **from below and from above / from above** install a deflection head as standard implementation with at least 15 mm allowable movement.



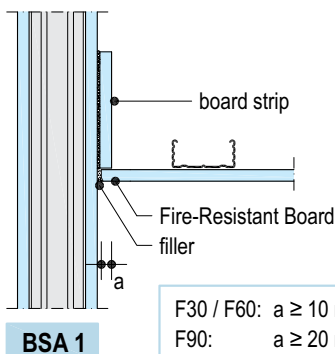
Note

In case of fire protection requirements for the partition the suspended ceiling should have at least the same fire resistance.

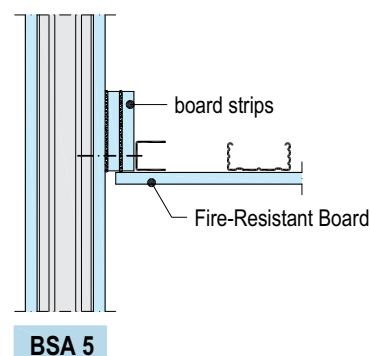
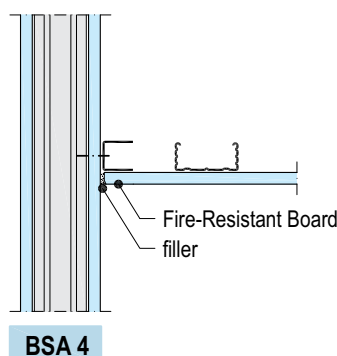
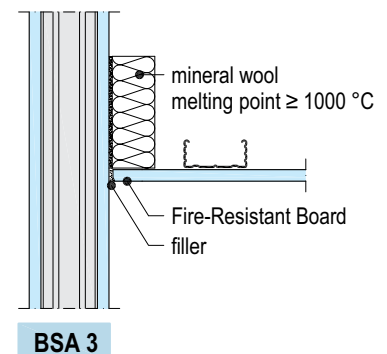
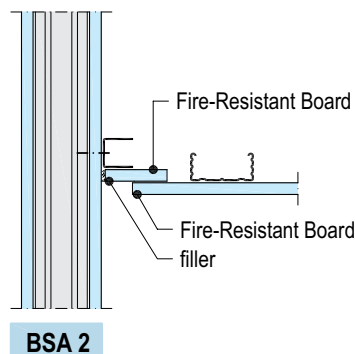
Fire protective connections to walls

Suspended ceilings in connection with basic ceilings of type I to III as well as suspended ceilings for fire protection solely from below and / or from above that are fire rated F30 to F90 can be connected to partitions if they are of the same fire resistance class.

Surface of partition should be even in the area of the connection. Specific levelling preparations might be necessary. The connection of the board ceiling has to be tight and covered.



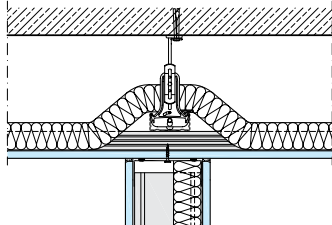
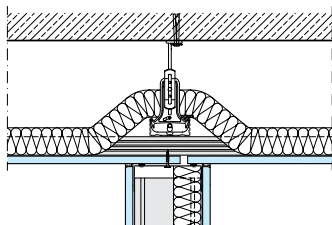
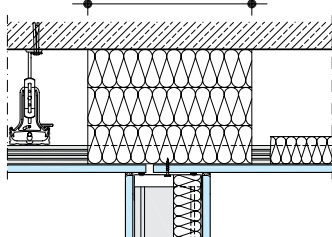
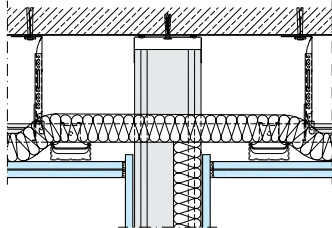
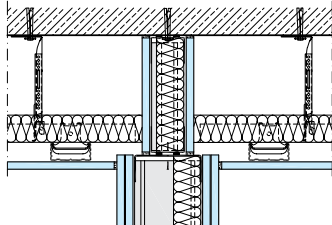
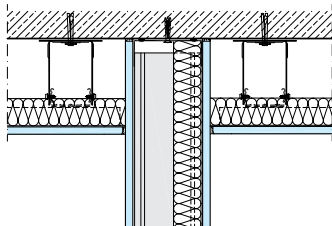
F30 / F60: $a \geq 10 \text{ mm}$
F90: $a \geq 20 \text{ mm}$



D11 Knauf Board Ceilings

Sound Protection following DIN 4109 Supplement 1 and 2

Longitudinal sound reduction index $R_{L,w,R}$

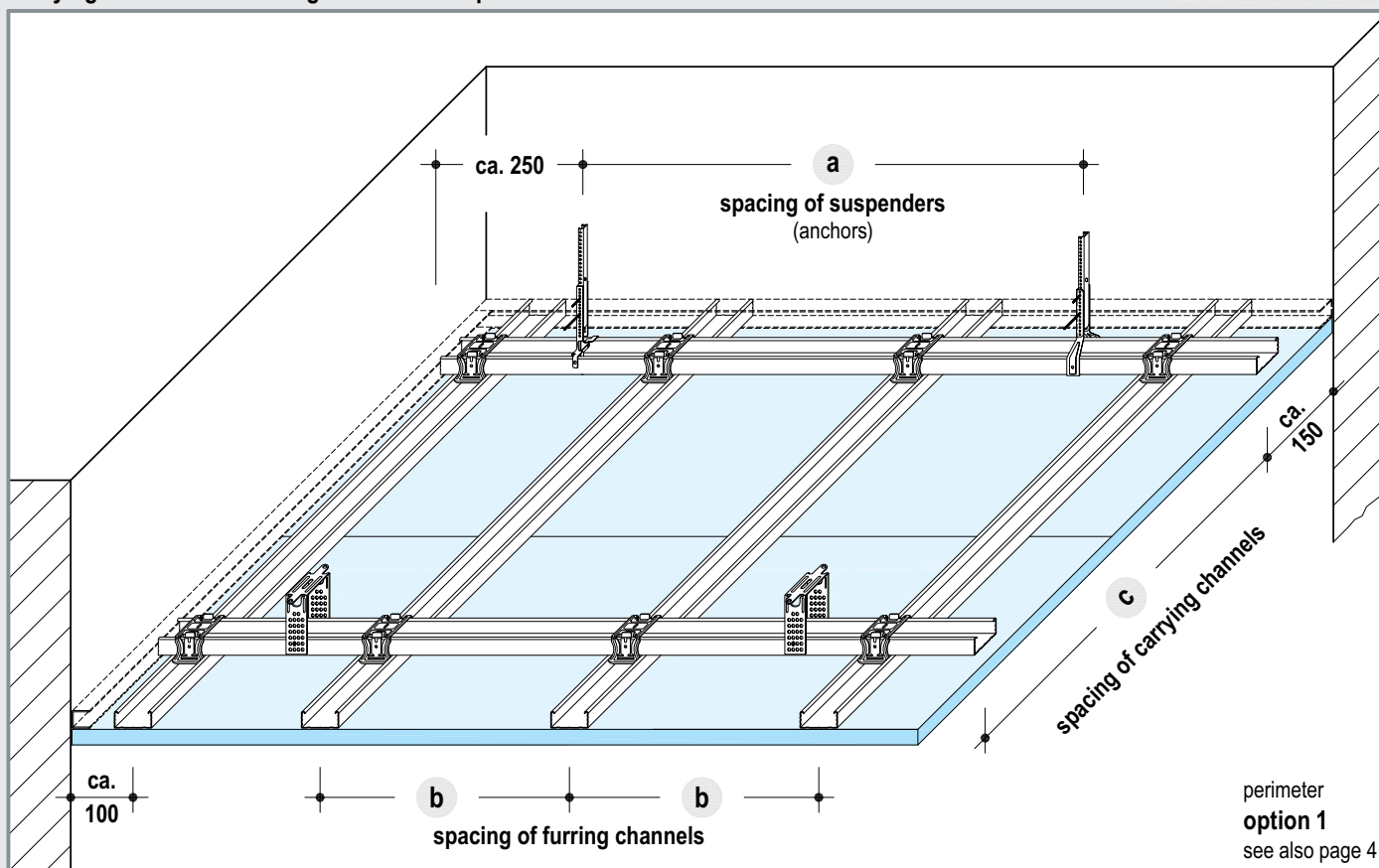
Board ceilings with non-perforated surface		Cladding	Rated longitudinal sound reduction indices $R_{L,w,R}$ in dB		
Suspension height 400 mm			without mineral wool		
			full area layer of mineral wool		
Examples of application		mm	≥ 40 mm	≥ 80 mm	
Connection of partition to suspended ceiling, continuous cladding		single layer ≥ 12.5 mm	46	47	48
		double layer ≥ 2x 12.5 mm	53	54	54
Connection of partition to suspended ceiling, cladding separated		single layer ≥ 12.5 mm	48	52	54
		double layer ≥ 2x 12.5 mm	55	57	57
Connection of partition to suspended ceiling, cladding separated with absorbent bulkhead *) ≥ 400 mm		single layer ≥ 12.5 mm	60		
Connection of partition to solid basic ceiling, with separation of suspended ceiling at cladding and construction		double layer ≥ 2x 12.5 mm	55	63	
Separation of plenum by bulkhead made of boards		single layer ≥ 12.5 mm	65		
Connection of partition to solid basic ceiling (the cladding up to the solid ceiling is effective as separating bulkhead of the plenum)		single layer ≥ 12.5 mm	65		

*) absorbent bulkhead made of mineral wool acc. to DIN EN 13162, length related flow resistance value $r \geq 8 \text{ kPa} \cdot \text{s/m}^3$

D112 Knauf Board Ceiling

Metal Grid

Carrying channels and furring channels / suspended



Maximum grid spacings

- without fire protection
- fire protection from below

all dimensions in mm

Spacings of carrying channel c	Spacings of suspenders a			only Ceiling below Ceiling F90 ¹⁾
	load class kN/m² (see page 2)			
	≤ 0.15	≤ 0.30	≤ 0.50 ¹⁾	
500	1200	950	800	750
600	1150	900	750	700
700	1100	850	700 ²⁾	650
800	1050	800	700 ²⁾	-
900	1000	800	-	-
1000	950	750	-	-
1100	900	750 ²⁾	-	-
1200	900	-	-	-

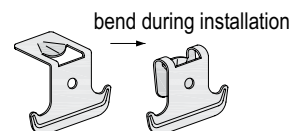
1) use suspenders of load capacity class 0.40 kN

2) not valid for spacing of furring channels of 800 mm

Channel connections

Carrying channel to furring channel

2x Clip for CD 50x27



Further construction information

without fire protection:

spacing of furring channels page 3

with fire protection:

spacings of furring channels and type / thickness of cladding pages 7 to 8
max. grid spacings (fire prot. from above) page 10

Notes

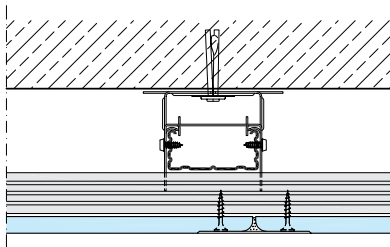
A customized dimensioning of the ceiling substructure is possible on request.

It is recommended to dimension the substructure considering a possibly additional ceiling ($\leq 0.15 \text{ kN/m}^2$).

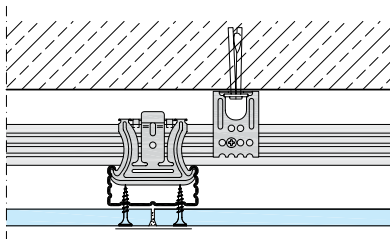
D112 Knauf Board Ceiling

Metal Grid

Universal Bracket 0.40 kN

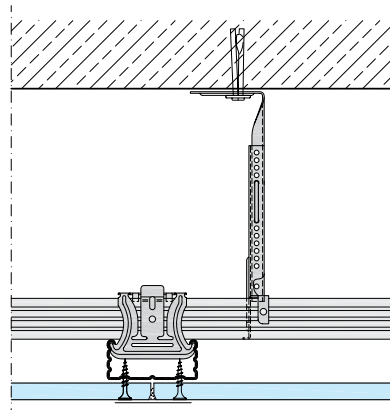


longitudinal joint

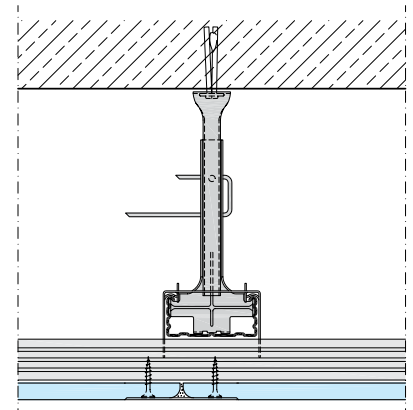


cut edge joint

suspended, e.g. with Nonius Suspension 0.40 kN



cut edge joint



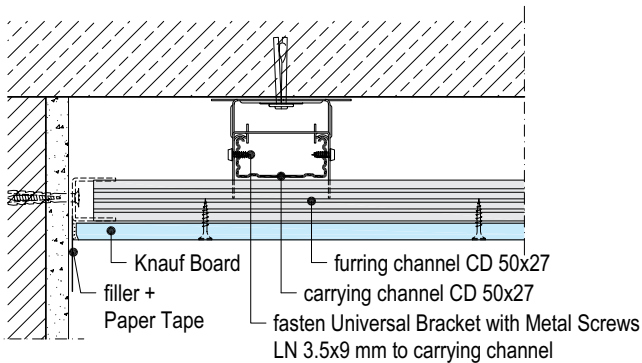
longitudinal joint

suspension options:

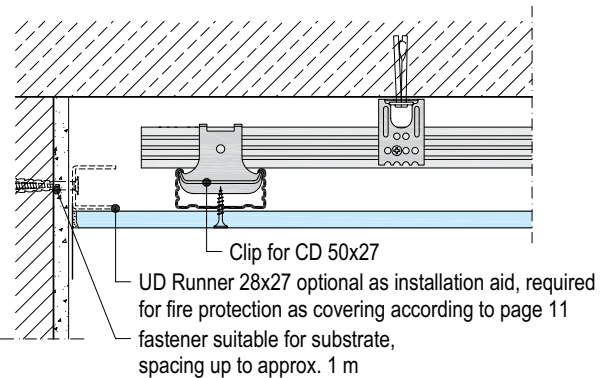
- Ankerfix Rapid Hanger 0.25 kN
- Nonius Suspension 0.40 kN
- Nonius Stirrup 0.40 kN

Details scale 1:5

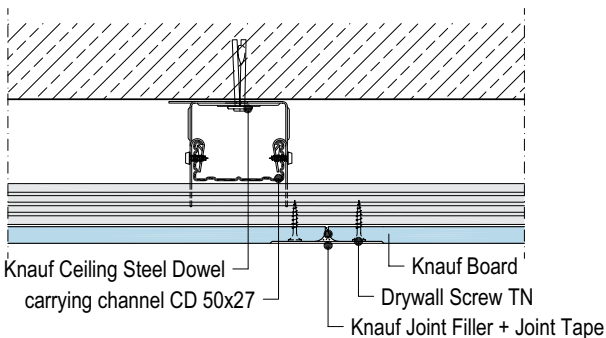
D112-A2 Connection to wall



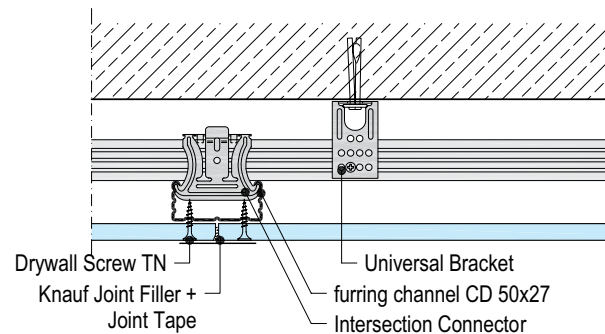
D112-D2 Connection to wall



D112-B2 Longitudinal joint



D112-C2 Cut edge joint

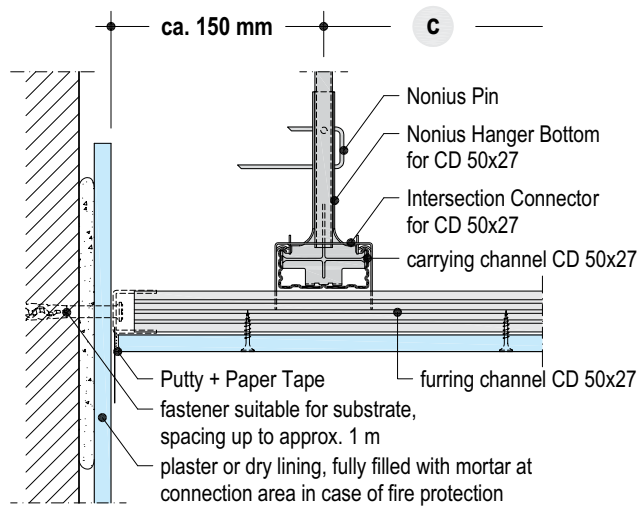


D112 Knauf Board Ceiling

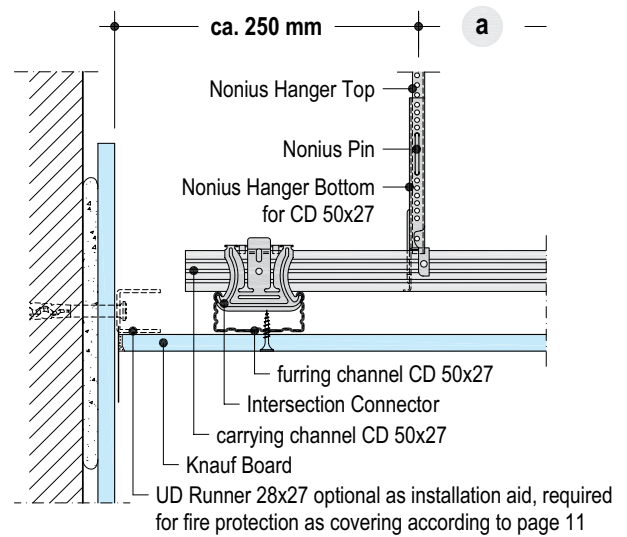
Metal Grid

Details scale 1:5

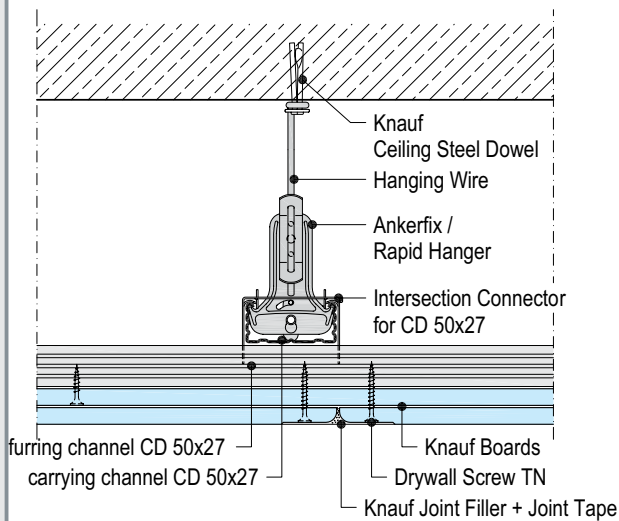
D112-A1 Connection to wall



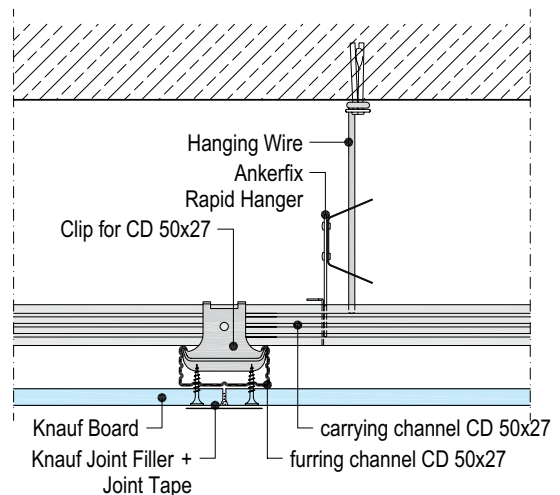
D112-D3 Connection to wall



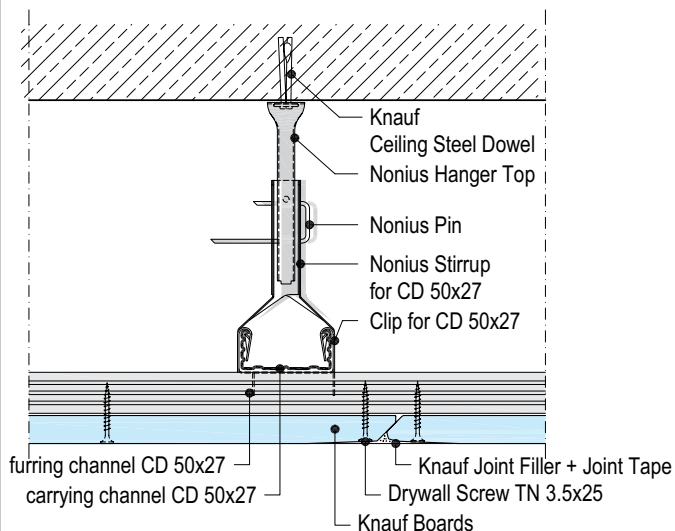
D112-B4 Longitudinal joint



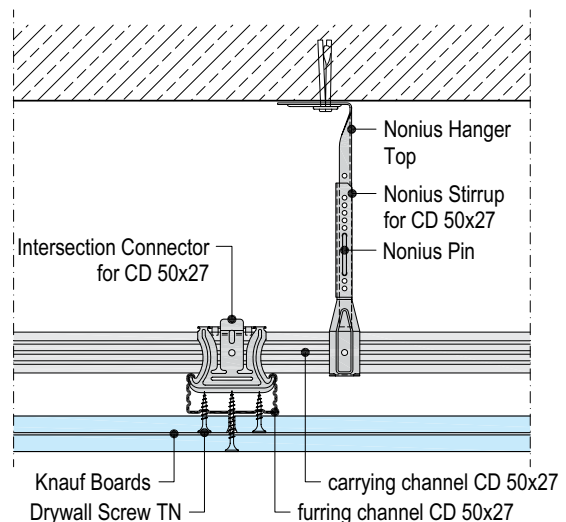
D112-C4 Cut edge joint



D112-B5 Longitudinal joint



D112-C1 Cut edge joint



D112 Knauf Board Ceiling

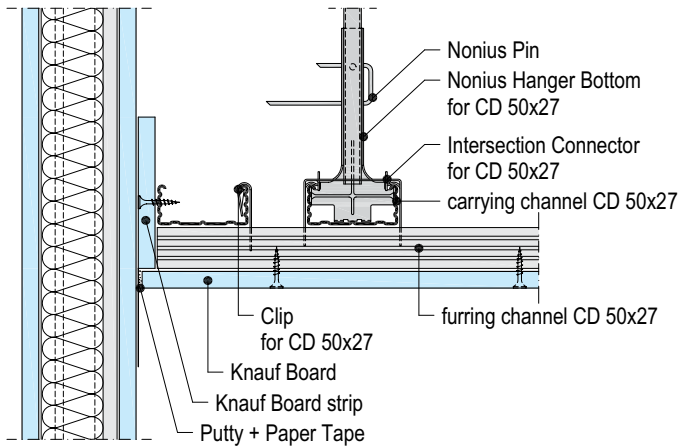
Metal Grid



Details scale 1:5

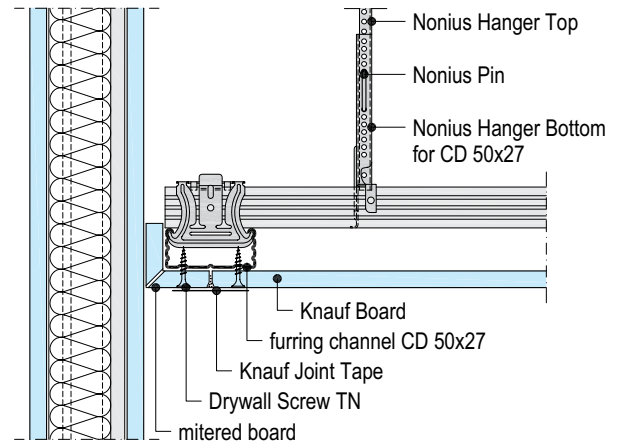
D112-A5 Vertically sliding connection to wall

option 1



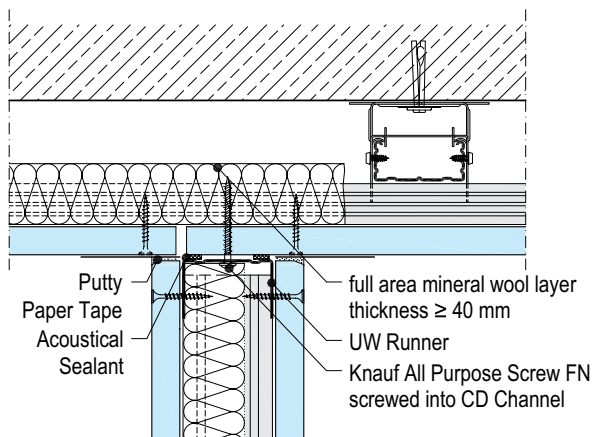
D112-D5 Vertically sliding connection to wall

option 2



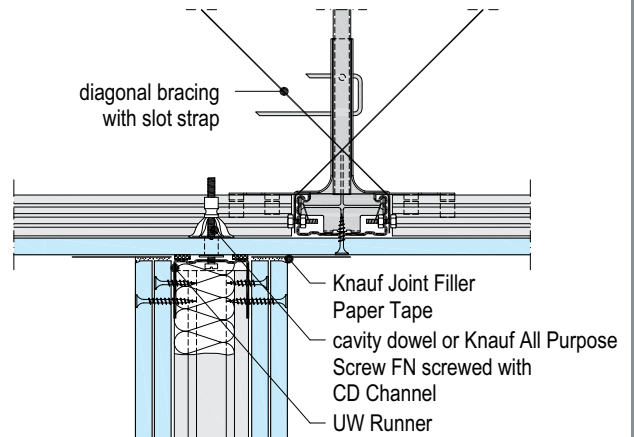
Sliding connections are suitable for fire resistance F30 as well.

D112-B6 Connection of partition to board ceiling



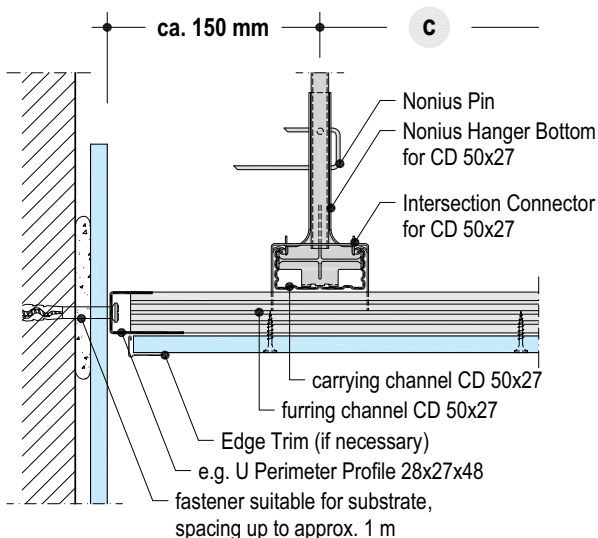
cladding separated at connection:
rated longitudinal sound reduction index $R_{Lw,R}$ 52 dB

D113-B4 Connection of partition to board ceiling

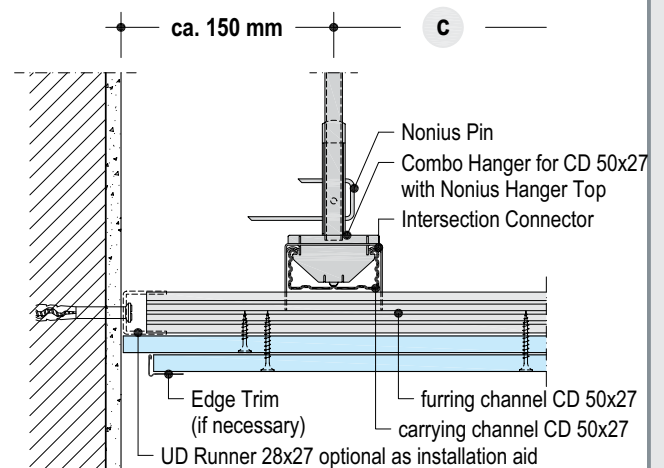


for connections of "lightweight" partitions to fire protective
classified suspended ceilings see page 11.

D112-A3 Connection to wall with exposed joint



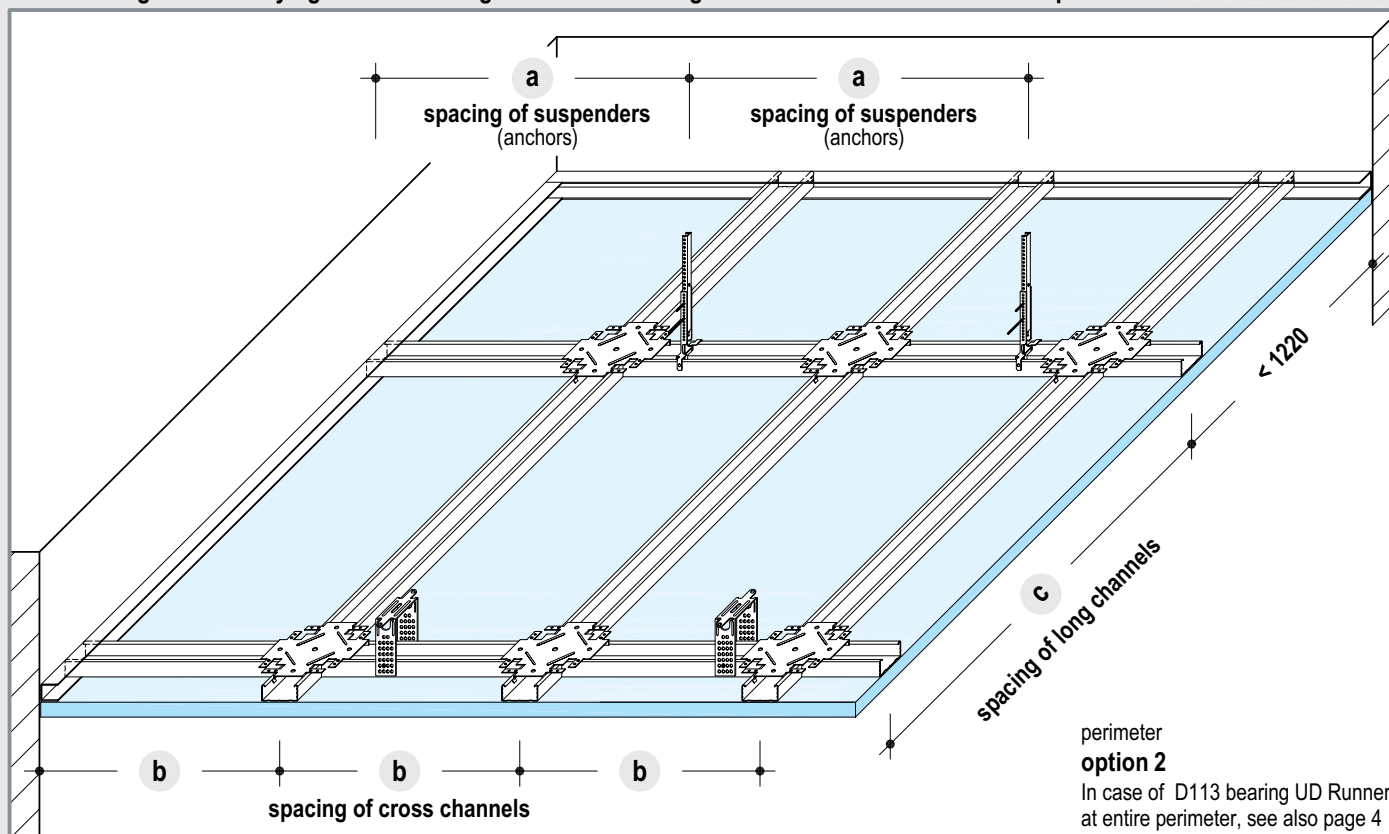
D112-A4 Connection to wall with exposed joint



D113 Knauf Board Ceiling

Flush Metal Grid

Flush metal grid with carrying channel as long channel and furring channels as cross channels / suspended



Maximum grid spacings

- without fire protection
- fire protection from below

all dimensions in mm

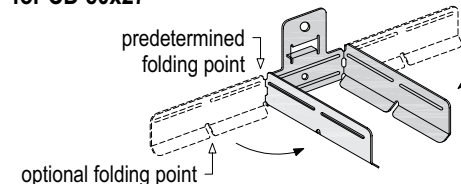
Spacing of long channels c	Spacings of suspenders a load class kN/m ² (see page 2)			Spacings of cross channels b
	≤ 0.15	≤ 0.30	≤ 0.50 ¹⁾	
1200	1100	650	-	600
	-	-	650	400

1) use suspenders of load capacity class 0.40 kN

Channel connections

Long channel to cross channel, flush

Universal Connector for CD 50x27



- delivered unbent
- adjust roughly, depending on use
- adjust correctly during assembly

Further construction information

with fire protection:

spacings of cross channels and
type/ thickness of cladding
max. grid spacings (fire prot. from above)

page 8 to 9
page 10

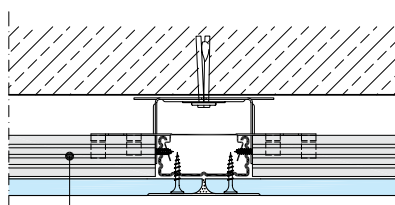
Note

A customized dimensioning of the ceiling substructure is possible on request.

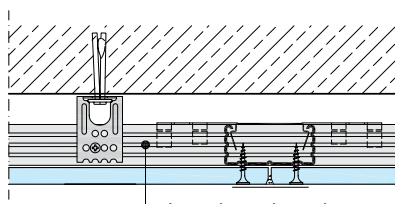
D113 Knauf Board Ceiling

Flush Metal Grid

Universal Bracket 0.40 kN

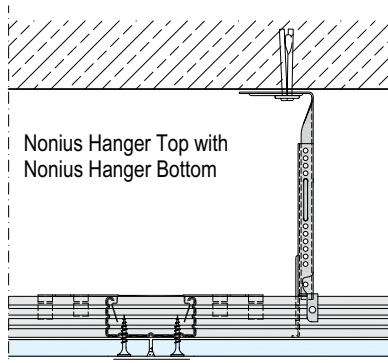


cross channel, length 1140 mm
longitudinal joint



long channel, continuous
cut edge joint

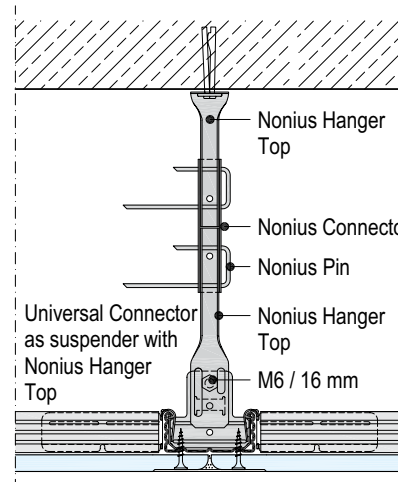
Suspended, e.g. with Nonius Suspension 0.40 kN



cut edge joint

suspension options

- Ankerfix Rapid Hanger 0.25 kN
- Nonius Suspension 0.40 kN

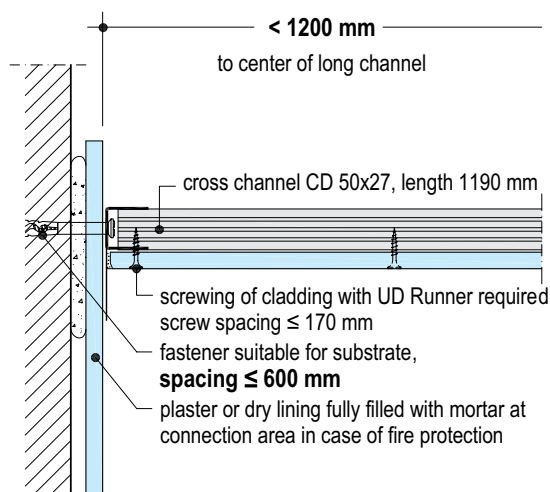


longitudinal joint

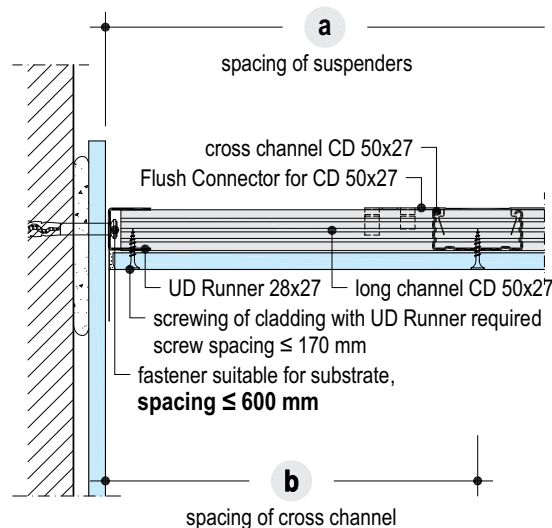
- Universal Connector as suspender with Nonius Hanger Top 0.40 kN

Details scale 1:5

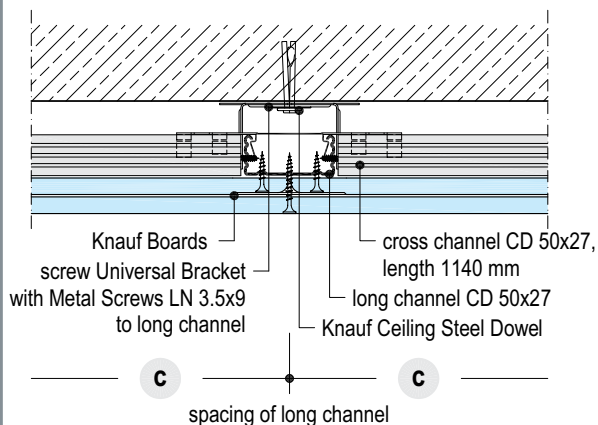
D113-A2 Connection to wall (load-bearing)



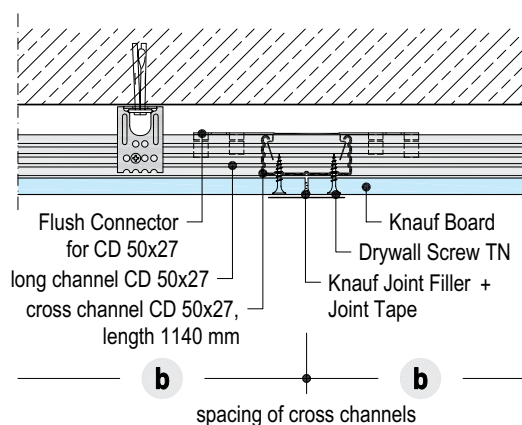
D113-D2 Connection to wall (load-bearing)



D113-B2 Longitudinal joint



D113-C2 Cut edge joint



D112/D113 Knauf Board Ceilings

Fire Resistance F90 • solely from below



D112 1.5 hours • solely from below see also page 8

installation scheme

dimensions in mm

Cladding

25 + 18 mm

or

2 x 20 mm

Fastening screws

Knauf Drywall Screws	Spacing of screws
1st layer: TN 3.5x35	300 mm *)
2nd layer: TN 3.5x55	170 mm

1st layer: TN 3.5x35 300 mm *)
2nd layer: TN 3.5x55 170 mm

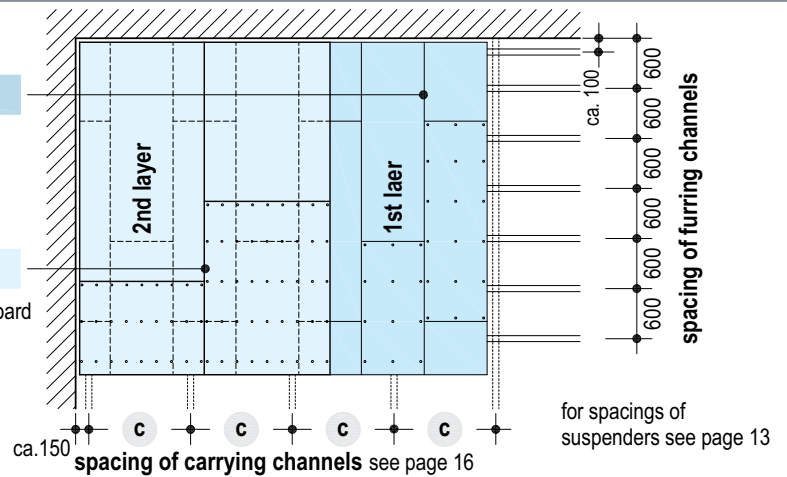
*) min. 3 screws per board width

1st layer

FR 25 mm,
width 600 mm

2nd layer

Fire-Resistant Board
FR 18 mm,
width 1200 mm



D113 1.5 hours • solely from below see also page 8

installation scheme

dimensions in mm

Cladding FR

25 + 18 mm

Fastening screws

Knauf Drywall Screws	Spacing of screws
1st layer: TN 3.5x35	300 mm *)
2nd layer: TN 3.5x55	170 mm

1st layer: TN 3.5x35 300 mm *)
2nd layer: TN 3.5x55 170 mm

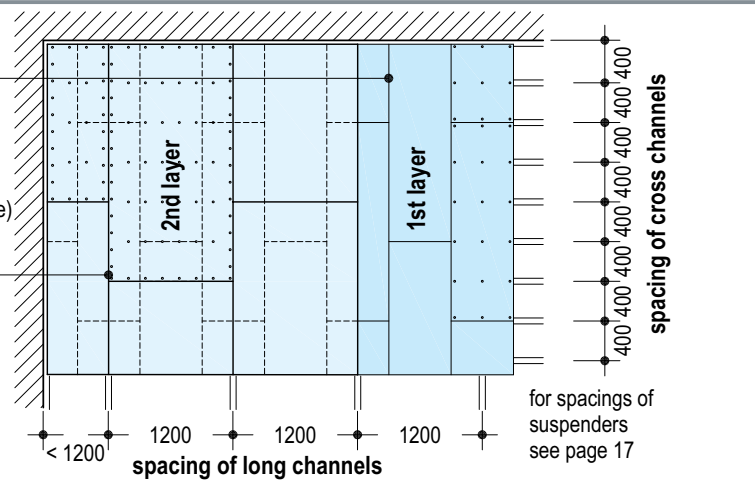
*) min. 3 screws per board width

1st layer

FR 25 mm,
width 600 mm
(installed with long
channel at center line)

2nd layer

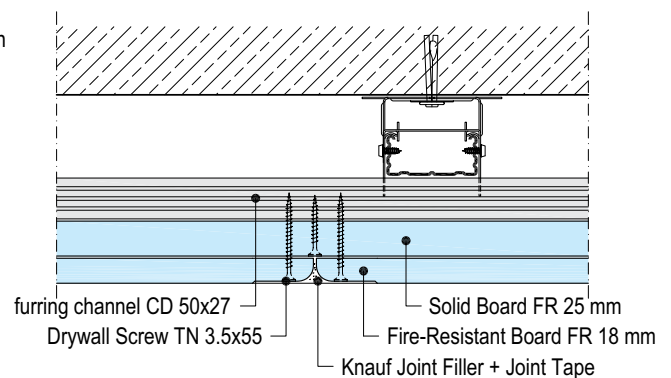
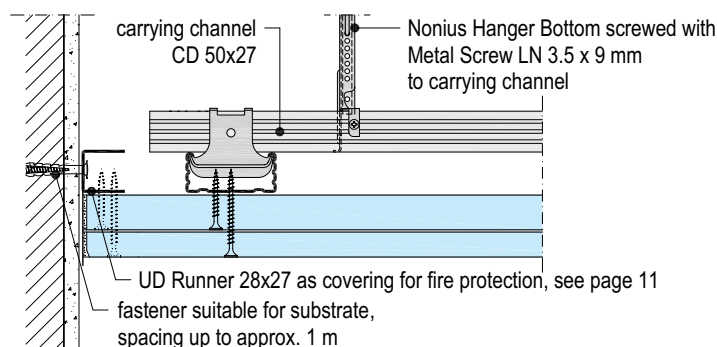
Fire-Resistant Board
FR 18 mm,
width 1200 mm



Details scale 1:5

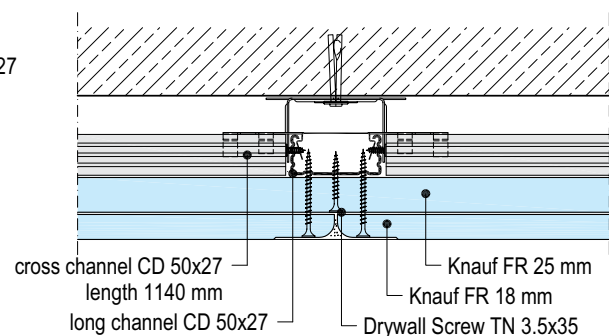
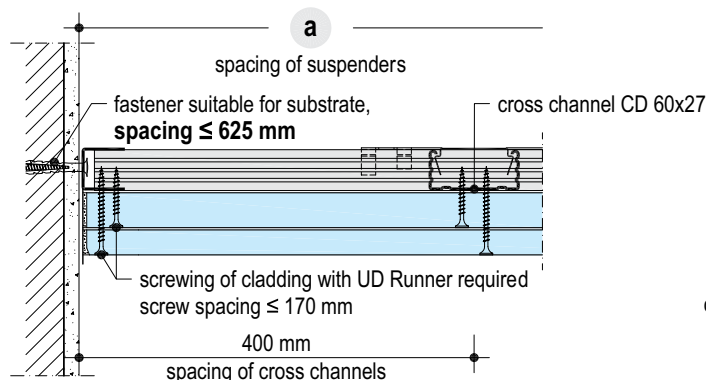
D112F90vu-D2 Connection to wall

D112F90vu-B1 Longitudinal joint



D113F90vu-D3 Connection to wall (load-bearing)

D113F90vu-B3 Longitudinal joint

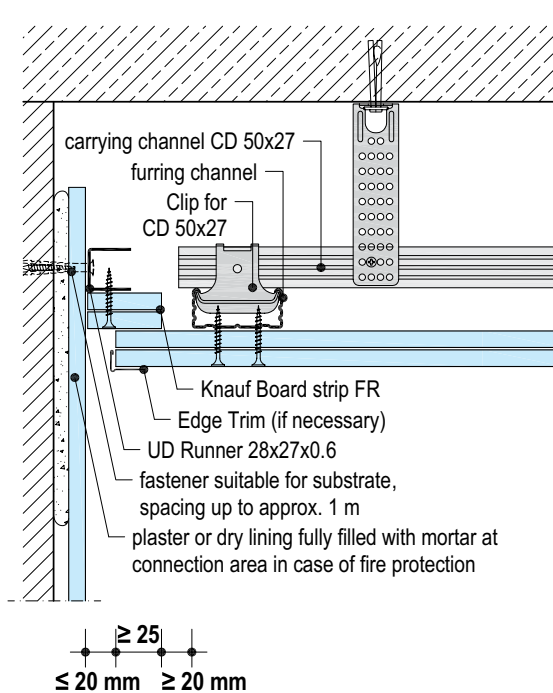
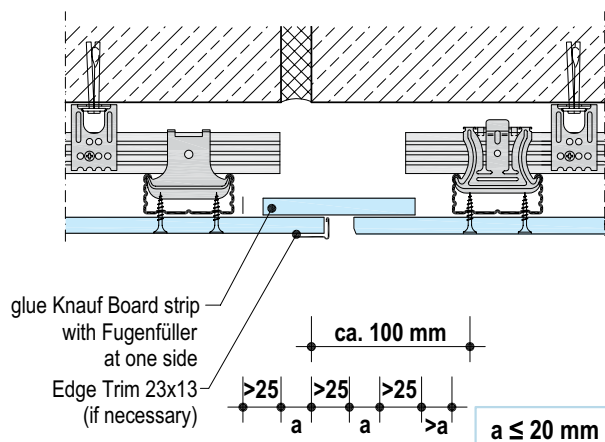


Connections to Walls / Settlement Joints

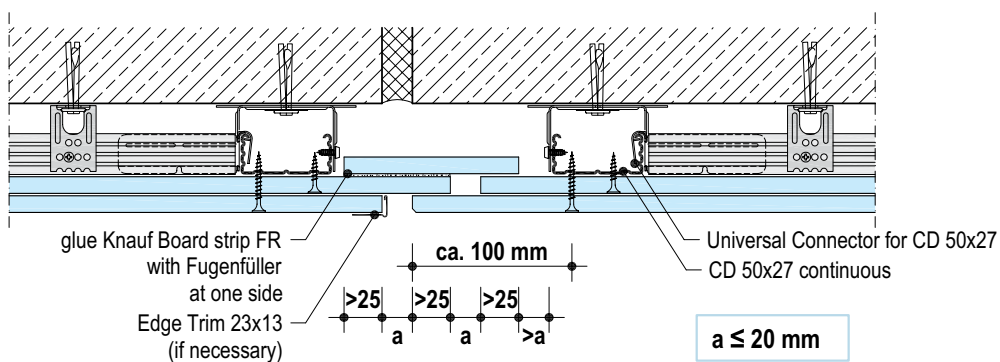
all dimensions in mm

D112-D4 Connection to wall with shadow gap

fire protection design



fire protection design



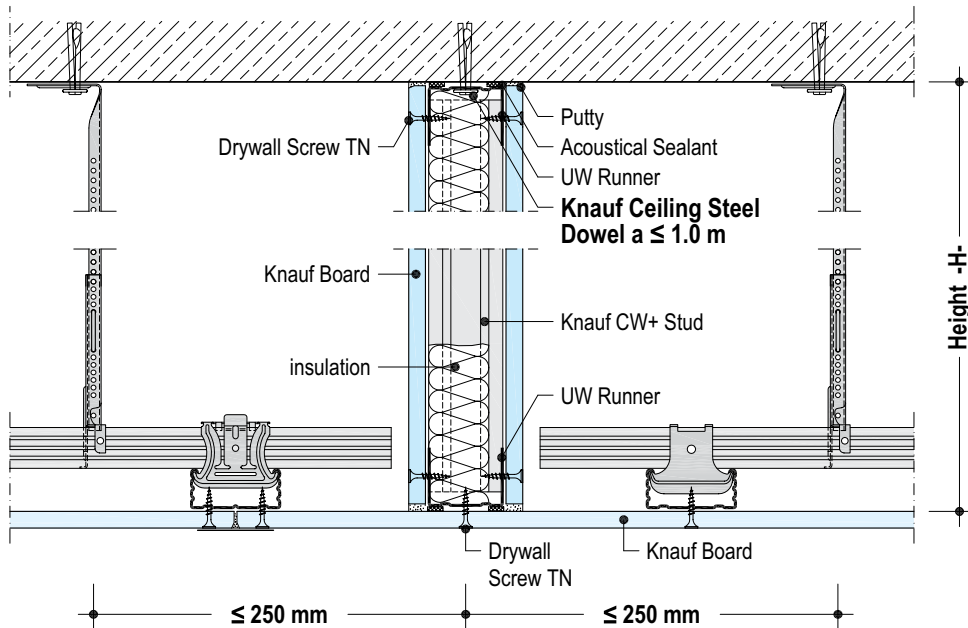
D11 Knauf Board Ceilings

Special Details

Details scale 1:5

Ceiling bulkhead

application according to Technical Data Sheet D16 Knauf Ceiling Built-ins



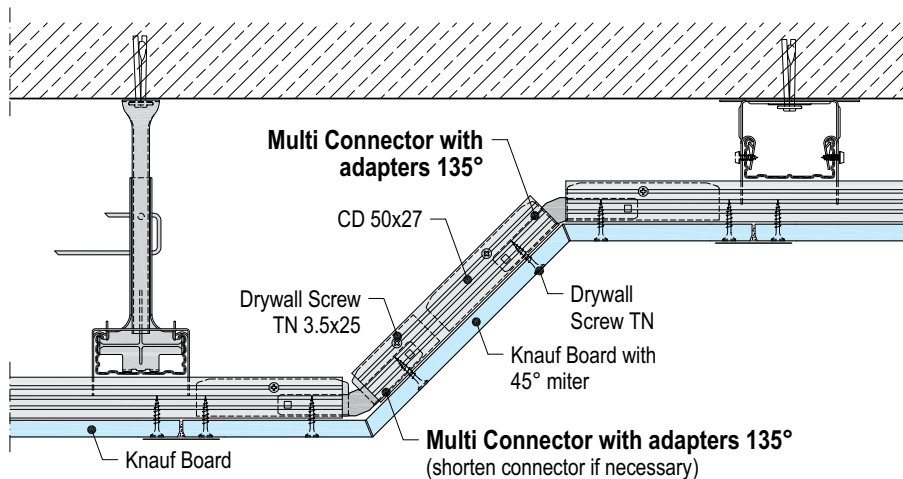
Height -H- m	Cladding of bulkhead Knauf Board mm
≤ 1.40	12.5
≤ 1.00	2x 12.5

If spacing of Ceiling Steel Dowel is reduced by 50%, allowable heights may be doubled

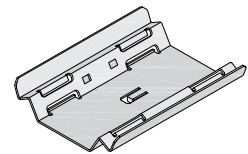
- rivet UW Runner with Knauf CW+ Stud

Split level ceiling 45°

application according to Technical Data Sheet D19 Knauf Designed Ceilings



Multi Connector for CD 50x27



Multi Connector Adapter

- adapter e.g. 135°



- for more adapters see Data Sheet D19

Reference for more information

D12 Knauf Cleaneo Acoustic Ceilings / D16 Knauf Ceiling Built-ins
(e.g. access panels, illuminations, ceiling bulkhead)

D11 Knauf Board Ceilings

Consumption of Material of Selected Examples



Consumption of material per m² ceiling without allowance for loss and waste.

Amounts refer to ceiling area of: 10 m x 10 m = 100 m²

Description <i>italic = not provided by Knauf</i>	Unit	Amount as average value D113		
		1	2	3
connection to wall UD Runner 28x27x0.6; length 3 m	m	0.4	0.4	0.4
<i>fastener approved for substrate</i> e.g. Knauf Ceiling Steel Dowel for reinforced concrete	pcs	0.7	0.7	0.7
substructure				
alt. Knauf Ceiling Steel Dowel (for reinforced concrete) <i>approved fastener</i>	pcs	0.7	1.2	1.2
Universal Bracket for CD 50x27 Metal Screws 2x LN 3.5x9 mm (fastening to CD Channel)	pcs	0.7 1.4	1.2 2.4	1.2 2.4
or Hanging Wire Ankerfix Rapid Hanger for CD 50x27	pcs	0.7 0.7	1.2 1.2	- -
or Nonius Hanger Top Nonius Pin Nonius Hanger Bottom for CD 50x27 Metal Screws 2x LN 3.5x9 mm (screwing to CD Channel)		0.7 0.7 0.7 -	1.2 1.2 1.2 -	1.2 1.2 1.2 2.4
alt. Universal Connector (as suspender) M 6 / 16 2x Nonius Hanger Top Nonius Connector 2x Nonius Pin Metal Screws 2x LB 3.5x9.5 mm	pcs	0.7 0.7 1.4 0.7 1.4 -	1.2 1.2 2.4 1.2 2.4 2.4	- - - - - -
CD Channel 50x27x0.6; length 4 m	m	0.8	0.8	0.8
CD Channel Connector	pcs	0.2	0.2	0.2
CD Channel 50x27x0.6; length 1.14 m	m	1.9	1.9	1.9
Flush Connector for CD 50x27		1.5	1.5	1.5
alt. Metal Screws 4x LN 3.5x9 mm (screwing to CD Channel)	pcs	-	-	6
Universal Connector		3	3	-
<i>mineral wool (consider fire protection specs, see pages 6 to 10)</i>	m ²	as req.	as req.	1
Knauf Boards (see below)	m ²	1	2	1
Screw attachment (fastening of Knauf Boards)				
Knauf TN 3.5 x 25 mm		27	9	27
Drywall TN 3.5 x 35 mm	pcs	-	27	-
Screws		-	-	-
Jointing				
Knauf Uniflott for hand filling; 25 kg bag resp. 5 kg bag	kg	0.3	0.5	0.35
or Knauf Fugenfuller for hand filling; 30 kg bag	kg	0.3	0.5	0.35
or Knauf Readyfix Joint Compound for hand filling; 28kg bucket	kg	0.4	0.6	0.45
Joint Tape (for cut and long edges)	m	1.4	1.4	1.4

as req. = as required

D113

1	• Standard Knauf Boards RG / MR 12.5 mm (≤ 0.15 *) hanger: 1100 mm; carr. chan.: 1250 mm; furr. chan.: 600 mm
2	• Standard • 0.5 hours solely from below Knauf Boards RG / MR resp. FR / FM 2x 12.5 mm (≤ 0.30 *) hanger: 650 mm; carr. chan.: 1250 mm; furr. chan.: 400 mm
3	• 0.5 hours solely from above Knauf Boards FR / FM 15 mm (≤ 0.30 *) hanger: 650 mm; carr. chan.: 1250 mm; furr. chan.: 400 mm

D11 Knauf Board Ceilings

Consumption of Material of Selected Examples



Consumption of material per m² ceiling without allowance for loss and waste.

Amounts refer to ceiling area of: 10 m x 10 m = 100 m²

Description <i>italic = not provided by Knauf</i>	Unit	Amount as average value D112			
		1	2	3	4
connection to wall					
UD Runner 28x27x0.6; length 3 m	m	0.4	0.4	0.4	0.4
<i>fastener approved for substrate</i> e.g. Knauf Ceiling Steel Dowel for reinforced concrete	pcs	0.4	0.4	0.4	0.4
substructure					
alt. Knauf Ceiling Steel Dowel (for reinforced concrete) <i>approved fastener</i>	pcs	1.2	1.5	2.1	2.4
Universal Bracket for CD 50x27	pcs	1.2	1.5	2.1	2.4
or Metal Screws 2x LN 3.5x9 mm (fastening to CD Channel)	pcs	2.4	3.0	4.2	4.8
Hanging Wire				-	-
or Ankerfix Rapid Hanger for CD 50x27	pcs	1.2	1.5	-	-
Nonius Hanger Top		1.2	1.5	2.1	2.4
Nonius Pin		1.2	1.5	2.1	2.4
Nonius Hanger Bottom for CD 50x27		1.2	1.5	2.1	2.4
or Metal Screws 2x LN 3.5x9 mm (screwing with CD Channel)	pcs	-	-	4.2	4.8
alt. Nonius Stirrup for CD 50x27		1.2	1.5	2.1	-
		1.2	1.5	2.1	2.4
CD Channel 50x27x0.6; length 4 m	m	3.2	3.2	3.5	3.5
CD Channel Connector	pcs	0.6	0.6	0.7	0.7
alt. Intersection Connector for CD 50x27	pcs	2.3	2.3	2.9	2.9
2x Clip for CD 50x27		4.6	4.6	5.8	5.8
<i>mineral wool (consider fire protection specs, see pages 6 to 10)</i>	m ²	as req.	as req.	as req.	1.2
Knauf Boards (see below)	m ²	1	2	2	2
Screw attachment (fastening of Knauf Boards)					
Knauf TN 3.5 x 25 mm		17	9	-	-
Drywall TN 3.5 x 35 mm	pcs	-	17	13	13
Screws TN 3.5 x 55 mm		-	-	21	17
Jointing					
Knauf Uniflott for hand filling; 25 kg bag resp. 5 kg bag	kg	0.3	0.5	0.8	1
Knauf Fugenfuller for hand filling 30 kg bag	kg	0.3	0.5	0.8	1.0
Knauf Readyfix Joint Compound for hand filling; 28kg bucket	kg	0.4	0.6	1.0	1.2
Joint Tape (for cut and long edges)	m	0.45	0.45	0.45	0.45

D112

1	• Standard • 0.5 hours below basic ceiling type II to III Knauf Boards RG / MR resp. FR / FM 12.5 mm
≤ 0.15 *)	hanger: 950 mm; carr. chan.: 1000 mm; furr. chan.: 600 mm
2	• Standard Knauf Boards RG / MR 2x 12.5 mm • 0.5 hours solely from below / F60 below basic ceiling I to III Knauf Boards FR / FM 2x 12.5 mm
≤ 0.30 *)	hanger: 750 mm; carr. chan.: 1000 mm; furr. chan.: 400 mm
3	• 1.5 hours solely from below Knauf Boards FR / FM (Solid Boards) 2x 20 mm
≤ 0.50 *)	hanger: 700 mm; carr. chan.: 800 mm; furr. chan.: 400 mm
4	• 1.5 hours solely from below and from above Knauf Boards FR / FM (Solid Boards) 25 + 18 mm
≤ 0.50 *)	hanger: 600 mm; carr. chan.: 750 mm; furr. chan.: 400 mm

as req. = as required

D11 Knauf Board Ceilings

Example Specifications



Knauf Non Fire Rated Suspended Ceiling System

System Description

System Code:

Ceiling Type

Framing Grid

Furring/Lower Channel Configuration:

Main/Upper Channel Configuration:

Perimeter Channel Configuration:

Anchoring to Basic Ceiling

Anchor Type:

Suspension System

Alternative 1:

Alternative 2:

Alternative 3:

Additional Accessories

Intersection Connectors:

CD Channel Extension Piece:

Board Cladding

Board Type

Screws

Finishing

Tape and Joint

Skim Coat (optional)

Knauf Suspended Ceiling/Lining D112

Ceiling Lining/Suspended Ceiling according to DIN 18168-1

Knauf CD50/27/0.6mm Channels spaced at 600mm

Knauf CD50/27/0.6mm Channels spaced at 1000mm

Knauf UD28/27/0.6mm Channels fixed to perimeter

Knauf Ceiling Steel Dowel or Approved Anchors

4mm thick Knauf Hanger Wires attached to structural soffit and main CD Channel as suspender

Load Class of Suspender : 25kg

Spacing of Suspender: 950mm

Max. Allowable Ceiling Drop: 2000mm

Additional Accessories: Knauf Ankerfix/Rapid Hanger

Knauf Nonius Hanger Top attached to structural soffit and main CD Channel as suspender

Load Class of Suspender : 40kg

Spacing of Suspender: 950mm

Max. Allowable Ceiling Drop: 5000mm

Additional Accessories: Knauf Nonius Stirrup and Nonius Pin

Knauf Universal Bracket (50/75/120mm) attached to structural soffit and main CD Channel as suspender

Load Class of Suspender : 40kg

Spacing of Suspender: 950mm

Max. Allowable Ceiling Drop: 120mm

Knauf Clips

Knauf CD Channel Connector

1x12.5mm Knauf Regular Gypsum Board to furring channels ** Use Knauf Moisture resistant Gypsum Board in humid areas

Knauf TN25mm Drywall Screws spaced at every 170mm

Taped and jointed for a seamless finish using Knauf Joint Tape and Joint Compounds

Skim coating with Knauf Readyfix for Q3 level high quality surface level requirement

Knauf Non Fire Rated Suspended Ceiling System wit Flush Grid

System Description

System Code:

Ceiling Type

Framing Grid

Long Channel Configuration:

Cross Channel Configuration:

Perimeter Channel Configuration:

Anchoring to Basic Ceiling

Anchor Type:

Suspension System

Alternative 1:

Alternative 2:

Additional Accessories

Intersection Connectors:

CD Channel Extension Piece:

Board Cladding

Board Type

Screws

Finishing

Tape and Joint

Skim Coat (optional)

Knauf Suspended Ceiling/Lining D113

Ceiling Lining/Suspended Ceiling according to DIN 18168-1

Knauf CD50/27/0.6mm (3000mm long) Channels spaced at 1200mm

Knauf CD50/27/0.6mm (1140mm long) Channels spaced at 600mm

Knauf UD28/27/0.6mm Channels fixed to perimeter

Knauf Ceiling Steel Dowel or Approved Anchors

4mm thick Knauf Hanger Wires attached to structural soffit and main CD Channel as suspender

Load Class of Suspender : 25kg

Spacing of Suspender: 1100mm

Max. Allowable Ceiling Drop: 2000mm

Additional Accessories: Knauf Ankerfix/Rapid Hanger

Knauf Universal Bracket (50/75/120mm) attached to structural soffit and main CD Channel as suspender

Load Class of Suspender : 40kg

Spacing of Suspender: 1100mm

Max. Allowable Ceiling Drop: 120mm

Knauf Universal Connector

Knauf CD Channel Connector

1x12.5mm Knauf Regular Gypsum Board to furring channels ** Use Knauf Moisture resistant Gypsum Board in humid areas

Knauf TN25mm Drywall Screws spaced at every 170mm

Taped and jointed for a seamless finish using Knauf Joint Tape and Joint Compounds

Skim coating with Knauf Readyfix for Q3 level high quality surface level requirement

D11 Knauf Board Ceilings

Example Specifications



Knauf Fire Rated Suspended Ceiling System with 90 minutes fire protection from below

System Description

System Code:

Knauf Suspended Ceiling/Lining D112

Ceiling Type

Ceiling Lining/Suspended Ceiling according to DIN 18168-1

Performance

Fire Resistance Class

90 minutes fire protection from below for protecting the basic ceiling and the plenum when tested according to DIN4102-2

Framing Grid

Furring/Lower Channel Configuration: Knauf CD50/27/0.6mm Channels spaced at 400mm

Main/Upper Channel Configuration: Knauf CD50/27/0.6mm Channels spaced at 800mm

Perimeter Channel Configuration: Knauf UD28/27/0.6mm Channels fixed to perimeter

Anchoring to Basic Ceiling

Anchor Type:

Knauf Ceiling Steel Dowel or Approved Anchors

Suspension System

Alternative 1:

Knauf Nonius Hanger Top attached to structural soffit and main CD Channel as suspender

Load Class of Suspender : 40kg

Spacing of Suspender: 700mm

Max. Allowable Ceiling Drop: 5000mm

Additional Accessories: Knauf Nonius Stirrup and Nonius Pin

Alternative 2:

Knauf Universal Bracket (50/75/120mm) attached to structural soffit and main CD Channel as suspender

Load Class of Suspender : 40kg

Spacing of Suspender: 700mm

Max. Allowable Ceiling Drop: 120mm

Additional Accessories

Intersection Connectors:

Knauf Clips

CD Channel Extension Piece:

Knauf CD Channel Connector

Board Cladding

Board Type

3x15mm Knauf Fire Resistant Gypsum Board to furring channels ** Use Knauf Fire and Moisture Resistant Gypsum Board in humid areas

Screws

Knauf TN55mm Drywall Screws spaced at every 170mm for the final layer

Knauf TN45mm Drywall Screws spaced at every 300mm for the second layer

Knauf TN25mm Drywall Screws spaced at every 500mm for the first layer

Finishing

Tape and Joint

Taped and jointed for a seamless finish using Knauf Joint Tape and Joint Compounds

Skim Coat (optional)

Skim coating with Knauf Readyfix for Q3 level high quality surface level requirement

Note

Example specifications given on pages 24 and 25 are for guidance purposes only. Based on the technical information given on this brochure, project specifiers can modify all of the performance and construction values in order to match their project requirements when specifying D11 Ceiling systems.

For specification support please contact Knauf Drywall Systems technical team.

D11 Knauf Board Ceilings

Construction, Application



Construction

Knauf Board Ceilings are anchored directly to the basic ceiling as a ceiling lining, or with a suspension as suspended ceiling.

Knauf Boards are screwed on a metal grid made of carrying channels and furring channels (D112) or on a flush metal grid made of long and cross channels (D113).

Select board type considering technical and building physical requirements.

Settlement joints have to be taken over into the construction of the ceiling system.

Use control joints in the case of ceiling areas over approx. 15 m length, or for narrow ceiling spaces caused by a break of a wall.

Separate gypsum boards from building elements made with materials other than gypsum, especially columns, by creating control joints that allow for movement, e.g. shadow gap.

Knauf profiles are delivered galvanized. This corrosion protective coating is sufficient for indoor rooms, including bathrooms and kitchens in private housing. For other areas, e.g. exposed to outdoor air, additional corrosion protection is necessary (see DIN 18168-1 table 2).

Application

Substructure

Anchoring to basic ceilings made of

- reinforced concrete: Knauf Ceiling Steel Dowel (used in accordance with Construction Supervisory Permit no. Z-21.1-1519),
- other building materials: anchors have to be permitted and standardized for the building material being used.

Fire protection from above: Use anchor that is approved for fire protection purposes (Knauf Ceiling Steel Dowel). Suspension of channels only with suspenders according to page 10 (consider additional measures).

Suspend with Hanging Wire and Ankerfix Rapid Hanger (lock lever), Universal Connector, Universal Bracket, Nonius Hanger (screw with channel in case of fire protection from above or total ceiling weight of $\geq 0.4 \text{ kN/m}^2$) or Nonius

Stirrup. Secure Nonius Pin against sliding out.

For spacings of anchors and channels or battens see tables of systems. Connect carrying battens / channels with suspenders and align planely in required height.

Connections of channels / battens

- D112: carrying CD channel to furring CD Channel with CD Intersection Connector or Clips for CD 50x27
- D113: long CD channel to cross CD Channel with Flush Connector or Universal Connectors

Connection to wall with UD Runner 28/27 as load-bearing connection, installation aid or in case of fire protection; fastening with anchor that is suitable for the respective building material, spacing of fasteners 1 m max. (non load-bearing) resp. 625 mm max. (load-bearing). For sound protection requirements seal up carefully with acoustical sealant according to DIN 4109, supplement 1, chapter 5.2; porous sealant strips like Sealing Tape are usually not suitable in this case.

Cladding

Apply boards laterally to furring channels (D112/ D113).

Apply cut edge joints on battens / channel and stagger them for at least 400 mm.

Start fastening of Knauf boards either in the middle or at a corner in order to prevent upsetting deformation. Press boards firmly on to the grid and screw with Drywall Screws TN according to page 3.

Carry out connections to other constructional components with paper tape and putty cover connection with runner/ board strips in case of fire protection.

D11 Knauf Board Ceilings

Fastening of Loads, Jointing, Surface Treatment

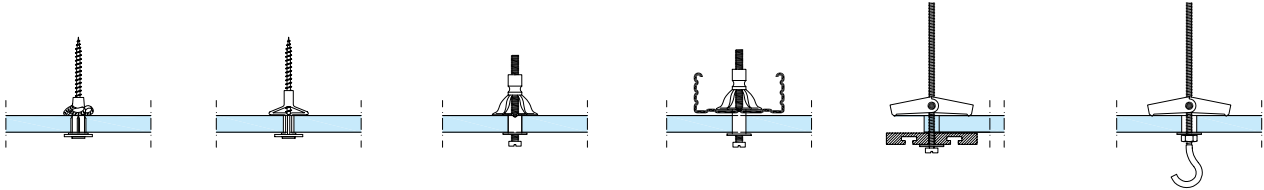
Fastening of loads to Knauf Board Ceilings

Ceiling lights, curtain rods etc. can be fastened to board ceilings using universal dowels, cavity dowels or toggles.

Single loads fastened directly to the cladding should not exceed 0.06 kN per span width of board.

Additional loads (extra loads like ceiling lights, curtain rods etc.) have to be considered for the calculation of the total ceiling load according to diagram on page 2 or should be fastened directly to the basic ceiling.

In case of fire protection the fastening of loads to cladding or channels is not permissible, fastening of loads only to basic ceiling.



Jointing

Filling compounds

- with Joint Tape: hand filling with Knauf Fugenfüller / Uniflott / Knauf Readyfix Joint Compound
- Knauf Uniflott impregnated is the system filling compound for impregnated Knauf Boards. It is water-repellent and matches the color of impregnated Knauf Boards
- use Knauf Readyfix Joint Compound for the final filling coat as fine skimming before sanding the joints

Application

- for multi layer cladding, fill in joints of first layers, smooth joints of top layer
- fill all visible screw heads as well
- Recommendation: Fill cut edge joints of visible layers using tape no matter which filling material is used
- use Knauf Spezialgrund to prime the entire surface of filled Knauf Boards to control suction and for optical harmonization of the surface. Knauf Spezialgrund is a system component for the creation of surfaces with higher quality requirements
- quality standards Q1 to Q4 according to Code of Practice no. 2 "Verspachtelung von Gipsplatten - Oberflächengüten" of the IGG

Application time / climate

- Filling of joints should only take place after the boards have been allowed to rest in the given humidity and temperature zones, and no more longitudinal changes can be expected, i.e. expansion or contraction.
- Joints should be filled at a minimum temperature of +10°C (50°F).
- in case of mastic asphalt screed, fill in joints after screed has been applied

Surface treatment

Before applying paints or coats the filled surface should be dust-free. Use a primer on Knauf Boards before coating or painting them. Ensure that the primer and the coat or paint are compatible.

To settle the different suction properties of the filled areas and the paper surface, primers like e.g. Knauf Tiefengrund/ Spezialgrund/ Putzgrund are suitable.

In case of wallpaper lining a primer that allows an easier removal of wallpaper for redecoration is recommended.

After wallpapering or plastering ensure adequate ventilation for fast drying.

The following coats can be used on Knauf Boards:

Wallpapers: paper-, textile and synthetic wallpapers. Use only adhesives made of cellulose according to Code of Practice no. 16 "Technische Richtlinien für Tapezier- und Klebearbeiten", Frankfurt/Main 2002, released by Bundesausschuss Farbe und Sachwertschutz.

Plasters: Knauf structured plasters, Knauf indoor plasters, Knauf Acoustic Plaster, entire surface smoothing like e.g. Knauf Readyfix, mineral plasters in connection with paper taped jointing.

Coats: Resin dispersion paints, multicolored (rainbow) emulsion, oil paint, matte-finish lacquer, alkyd resin paint, polymer resin paint, PUR lacquer, or epoxybased lacquer, according to intended use or as required.

Alkaline coats such as lime, water glass paints and silicate-based paints are unsuitable for gypsum board surfaces.

Silicate-based emulsion paints may be used after referring to the manufacturer's recommendations and following the stipulated guidelines closely.

Gypsum plasterboard surfaces that have constantly been exposed to light without any protection can cause yellowing after coating. Therefore a trial coat is recommended that will extend across several boards including all joints. Yellowing can, however, be successfully avoided only by using a special primer.

Knauf Drywall Systems publishes updated technical information on various products and topics. In order to request any of the brochures listed below, please contact our office at the address given below.

Knauf Drywall Systems Guide

Knauf Access Panels Brochure

Knauf Drywall Tools Brochure

Knauf Drywall Training Brochure

Knauf Cleaneo Acoustic Ceilings Brochure

D11 Knauf Ceilings Technical Datasheet

W11 Knauf Partitions Technical Datasheet

D12 Knauf Cleaneo Acoustic Ceilings Technical Datasheet

Knauf Access Panels Technical Brochure